

PLIO-PLEISTOCENE BIRD REMAINS FROM THE
 CARPATHIAN BASIN III.
 STRIGIFORMES, FALCONIFORMES, CAPRIMULGI-
 FORMES, APODIFORMES

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In two previous papers I dealt with the *Galliform* birds of the corresponding territory and age. Among the Plio-Pleistocene bird remains of the Carpathian Basin no other order of birds has the same systematico-stratigraphical significance as the chickenlike birds. While the remains of the latter order occur regularly and often in large quantities in faunas which contain birds at all, the bones originating from other orders are generally sporadical and occasional.

I chose for the next chapter the description of the remains of birds of four different orders; three of them are in the opinion of recent zoologists strongly related on the basis of etological-phenological arguments the owls (*Strigiformes*), the nightjars

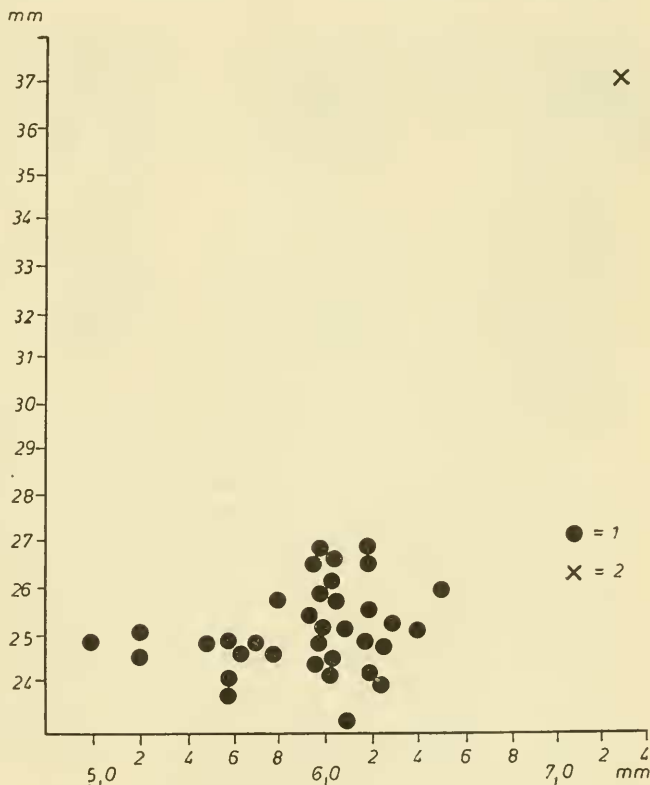
(*Caprimulgiformes*) and the swifts (*Apodiformes*). Against a series of anatomical and ethological resemblances these relation-

Fig. 1. Scatter diagram showing the ratio of length (perpendicular axis) and width of diaphysis (horizontal axis) of the tarsometatarsi of fossil and recent *Surnia* species

1. *Surnia ulula*, Upper Pleistocene and recent; 2. *Surnia robusta* n. sp., Loc. 3. Villány, Lower Pleistocene

1. ábra. A csonthossz (függőleges tengely) és diaphysis-szélesség (vízszintes tengely) adatainak szórásdiagramja (mm) fosszilis és recens karvalybaglyok láb-középcsontján

1. *Surnia ulula*, felsőpleisztocén és recens; 2. *Surnia robusta* n. sp., Villány 3. alsó-pleisztocén



ships are not supported osteologically. On the other hand, the (diurnal) birds of prey (*Falconiformes*) and the owls (*Strigiformes*) are despite numerous anatomical and ethological differences, osteologically related, moreover there are in some groups „transitional” features: e.g. in the osprey (*Pandion haliaetus*) which has no f. ramen on the anterior surface of the femur but possesses a bony bridge over the extensor groove in the tarsometatarsus and the fourth digit of the pes is reversible, all typical features of the owls. These facts speak on the one hand for a very old (Lowest Tertiary) but in their roots strong relationship of the two latter orders and on the other for a mosaic-like evolution of different details of the body of all orders under discussion. Therefore I agree with DEMENTIEV (1951) who emphasises (not on the basis of osteological investigations!) the numerous characteristics of owls in common with diurnal raptors with those of e.g. the goatsuckers being only convergencies.

In other respects the owls, the birds of prey, as well as the swifts and the nightjars are osteologically well circumscribed groups and the determination of the members of these orders is quite unambiguous.

Order: *Strigiformes*

Family: *Strigidae*

Genus: *Surnia*

Surnia robusta n. sp.

(Fig. 1.—2.—3. and 5./9—10—11)

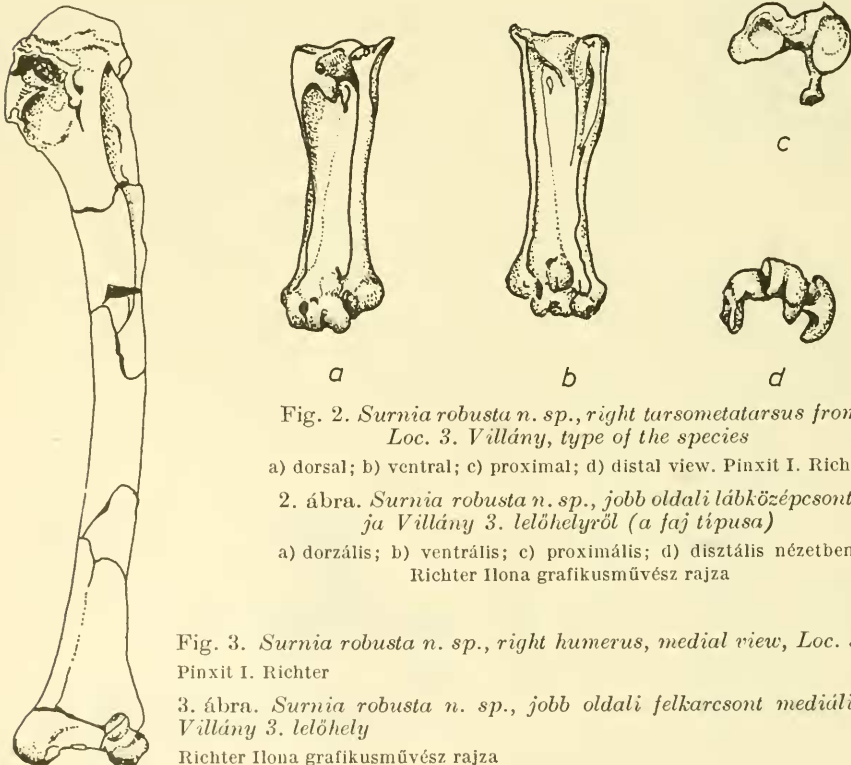


Fig. 2. *Surnia robusta* n. sp., right tarsometatarsus from Loc. 3. Villány, type of the species

a) dorsal; b) ventral; c) proximal; d) distal view. Pinxit I. Richter

2. ábra. *Surnia robusta* n. sp., jobb oldali lábközépcsontja Villány 3. lelőhelyről (a faj típusa)

a) dorzális; b) ventrális; c) proximális; d) disztális nézetben. Richter Ilona grafikusművész rajza

Fig. 3. *Surnia robusta* n. sp., right humerus, medial view, Loc. 3. Villány. Pinxit I. Richter

3. ábra. *Surnia robusta* n. sp., jobb oldali felkarcsont mediális nézetben, Villány 3. lelőhely

Richter Ilona grafikusművész rajza

Derivatio nominis: robusta, named after the Latin: robustus = strong, large, due to the huge dimensions.

Diagnosis: A large *Surnia* species, larger than the hitherto known recent and fossil forms of the genus.

Type-locality: Karst fissure of the Locality Villány 3., mts Villány, Southern Hungary.

Type-level: Lower Pleistocene („Middle Villafranchian”, „Upper Villanyian”).

Holotype: Complete left tarsometatarsus, leg. Kormos, T., Datum?; Inv. Nr. Geol. Inst. Vt. 62.

Paratype: Proximally and distally slightly damaged right humerus, from the same locality.

Further material:

Loc. Villány 3 („Villány-Kalkberg” „Villány-Süd” in older literature); besides the type and paratype:

Three dist. fragments of tibiotarsi; five fragments of tarsometatarsi; one mt₁, three phalanx I digit 1 posterior; two phal. 1. digit 2. post., 4 phal. 2. dig. 2. post.; 2 phal. 1 dig. 3; 2 phal. 2 dig. 2; three phal. 3 dig. 3, three phal. 4. dig. 4; nine ungual phalanges.

Loc. „Villány-Nagyharsány-hegy”, leg. KORMOS (according to literary data, it is undecided from which one of the hithero known four fissures of the eastern quarry of the Nagyharsány-hegy the material originates; see KRETZOI, 1956):

Cranial fragment of the coracoideum; three scapularfragm., two dist. fragm. of humeri: three proximal and one distal fragm. of carpometacarp; two phalanx 1 digit. 2 anterior; dist. fragm. of femur; five dist. fragm. of tibiotarsi; four different fragm. of tarsometatarsi; three phalanges 2 dig. 2 posterior; phal. 2 dig. 3 posterior; phal. 3 dig. 3 post.;

Loc. Beremend 4. (in KRETZOI, 1956), leg. KORMOS, 1936; Ungual phalanx (?phal. 2 dig. 1 posterior).

Loc. Osztramos 7, leg. JÁNOSSY, 1970: proximal fragment of the phalanx 2 digit 2 posterior.

This rich material, containing nearly seventy bones of nearly all anatomical regions, allows a satisfactory analysis and description of the new form.

For a detailed analysis, the type-specimen, the intact tarsometatarsus, is the most convenient. I compared it in detail with the same bone of all European *Strigiforms* as well as with extra-European ones available in the collections of the British Museum (Nat. Hist.), London and in the Humboldt Museum, Berlin.

A comparison with the corresponding bone of the following species was possible: *Otus scops* and *brucei*, *Bubo virginianus*, *Nyctea nyctea*, *Surnia ulula*, *Glaucidium passerinum* & *brasilianum*, *Athene noctua*, *Strix aluco*, *urallensis* and *nebulosa*, *Aegolius funereus*, *Asio otus* and *accipitrinus*, *Pulsatrix perspicillata*, *Ninox novaesealandiae*, *Gymnoglaux lawrencii*, *Speotyto cunicularia*, *Ciccaba virgata*, *Rhioptynx clamator*, *Ketupa ketupu*, *Scotopelia peli*, *Jubula letti*, *Mimizuku gurney*, *Pseudopteryx philippensis*, *Lophotrix cristata*, *Micrathene whitney*, *Uroglaux dimorpha*, *Sceloglaux albifacies*, *Pseudoscops grammicus* and *Nesasio solomonensis*.

The stout form and size of the bone delimits it from most recent and fossil species. Although there are some morphological resemblances with certain

Table 1.

Measurements of the tarsometatarsi of middle-sized owls [only extra-European species, measured in the collection of the British Museum (Natural History)]

Owls	Length	Proximal width (mm)
Ketupa ketupu	67	14
Pulsatrix perspicillata 1.	56	14
Pulsatrix perspicillata 2.	53	14
Ninox novaeseelandiae	35	7
Gymnoglaux lawrencii	38	6
Speotyto cunicularia	49	8
Ciccaba virgata	46	9
Rhioptynx clamator	55	13
Scotopelia peli 1.	70	15
Scotopelia peli 2.	75	13
Jubula lettii 1.	42	4
Jubula lettii 2.	40	6
Mimizuku gurney	50	8
Pseudoptynx philipensis	75	10

genera, e.g. with the Palearctic *Nyctea* (viz. metrical-proportional relations) and with some other ones, e.g. the Neotropical *Pulsatrix* (former *Ciccaba*) *perspicillata* and *Rhioptynx* (former „*Asio*”) *clamator*, the morphological relations seems closest with the tarsometatarsus of the monotypical species *Surnia ulula*.

I submit in table 1, for orientation, the length and the width on the narrowest point of the tarsometatarsi

of the owl species in the size category of our fossil specimens.

On the other hand, a metrical comparison of the tarsometatarsus of Vilány with that of 34 Upper Pleistocene and of recent specimens of the Hawk-Owl, given in a scatter diagram (see Fig. 1), proves unambiguously a statistically supported absolute difference in size (27% larger than the largest plusvariant of the recent form). In other respects the morphological resemblance of the tarsometatarsus of the new species and of *Surnia ulula* is in all details very close. The shape of the bone, from all details of the proximal and distal epiphysis to the form and width of the bony bridge over the extensor groove etc., shows such a close resemblance that there is no problem of a generic assignment.

The humerus — the most complete bone beside the tarsometatarsus — shows also unambiguously the generic features of *Surnia*; the strongly curved diaphysis, the elongated crista pectoralis, the widening of the distal epiphysis etc. speak all for this relegation.

The measurements of phalanges (see table 2.) evince that these bones are of the size of those of *Strix uralensis*, but with a stouter form, characteristic for the phalangeals of the hawk owl (*Surnia ulula*) with smaller dimensions. Although the generical characters of some other bones are not so pronounced, one relegate them to the same form owing to the near size category and proportions. As shown in table 2, all remains of the fossil form are absolutely larger than those of typical recent species. However, the differences in size as well as the proportions are not in each case the same. The humerus of the fossil species is larger only by 23% than that of the recent form, the phalanx 1. digit 2 anterior by 32%, the phalanx 1. digit 1 posterior by 40% etc. Thus the differences are mosaic-like and their proportions different.

Hitherto only one fossil species of the genus was described: *Surnia capeki* Jánossy, 1972, in the same size category as the recent birds, differing only in proportions and originating from the Middle Pleistocene (Stránská Skála).

Table 2.

Measurements of different bones of fossil and recent *Surnia*-species (in mm)

Measurements	Length	Prox. width	Dist. width	Width of diaphysis (middle)
<i>Humerus:</i>				
<i>Surnia robusta</i> n.sp.	± 100	18	15.5 – 16.0 (n=3)	6.7
<i>Surnia ulula</i> , recent	67 – 72 (n=7)	12	11	4.8
<i>Carpometacarpus:</i>				
<i>Surnia robusta</i> n.sp.	—	11.0 – 11.5 (n=2)	—	—
<i>Surnia ulula</i> , recent	—	8.8	—	—
<i>Phal. 1. digiti 2. anterior:</i>				
<i>Surnia robusta</i> n.sp.	21.3 – 22.6	—	—	—
<i>Surnia ulula</i> recent	14.8	—	—	—
<i>Femur:</i>				
<i>Surnia robusta</i> n.sp.	—	—	12	5.3
<i>Surnia ulula</i> recent	—	—	9.0	3.7
<i>Tibiotarsus:</i>				
<i>Surnia robusta</i> n. sp.	—	—	—	11.0 – 12.2
<i>Surnia ulula</i> recent	—	—	—	(n=6) 8.5
<i>Tarsometatarsus:</i>				
<i>Surnia robusta</i> n. sp.	37.2	12.6	12.6 – 15.0 (n=4)	7.3
<i>Surnia ulula</i> , Upper Pleistocene and recent (n=36)	23 – 27	9 – 10	9.0 – 10.5	5.0 – 6.5
<i>Phalanx 1. digiti 1. posterior:</i>				
<i>Surnia robusta</i> n. sp.	12.9 – 14.0 (n=4)	—	—	2.5 – 3.8
<i>Surnia ulula</i> recent	10.0	—	—	1.7
<i>Phal. 1. dig. 2. post.:</i>				
<i>Surnia robusta</i> n. sp.	8.5 – 9.0 (n=2)	—	—	4.6 – 4.8
<i>Surnia ulula</i> recent	6.6	—	—	3.5
<i>Phal. 2. dig. 2. post.:</i>				
<i>Surnia robusta</i> n. sp.	15.0 – 15.6 (n=6)	—	—	4.0 – 4.3
<i>Surnia ulula</i> recent	12.0	—	—	2.8
<i>Phalanx 1. dig. 3. post.:</i>				
<i>Surnia robusta</i> n. sp.	7.5 – 7.8 (n=2)	—	—	4.8 – 5.1
<i>Surnia ulula</i> recent	5.2	—	—	4.9
<i>Phal. 2. dig. 3. post.:</i>				
<i>Surnia robusta</i> n. sp.	7.5 – 9.0 (n=3)	—	—	4.5 – 5.0
<i>Surnia ulula</i> recent	5.7	—	—	3.3
<i>Phal. 3. dig. 3. post.:</i>				
<i>Surnia robusta</i> n. sp.	14.6 – 16.0 (n=2)	—	—	4.0(2×)
<i>Surnia ulula</i> recent	12.2	—	—	2.9
<i>Phal. 4. dig. 4. post.:</i>				
<i>Surnia robusta</i> n. sp.	12.1 – 12.6 (n=3)	—	—	2.8 – 3.6
<i>Surnia ulula</i> recent	9.0	—	—	2.1

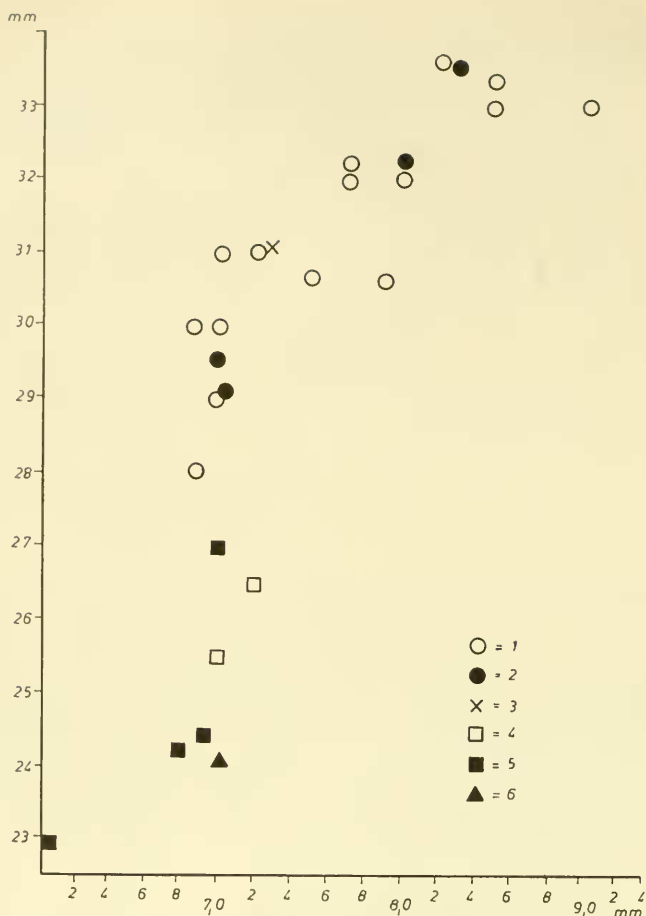


Fig. 4. Scatter diagram showing the ratio of length (perpendicular axis) and width of diaphysis (horizontal axis) of the phalanx 2 digiti posterior of fossil and recent *Aquila* species.

1. *Aquila chrysaetos* recent; 2. the same, Saint Estève Janson, France, Middle Pleistocene; 3. the same, Loc. 3. Villány, Lower Pleistocene; 4. *Aquila rapax* recent; 5. *Aquila heliaca*, recent; 6. the same, Lambrecht Cave, Upper Pleistocene

4. ábra. A csontössz (függőleges tengely) és diaphysis-szélesség (vízszintes tengely) adatainak szórásdiagramja (mm) fosszilis és mai sasfajok újpercénél (phalanx 2 digiti 2 posterior)

1. *Aquila chrysaetos* recens; 2. u. az, Saint Estève Janson, Franciaország, középső pleisztocén; 3. u. az Villány 3. alsó pleisztocén; 4. *A. rapax*, recens; 5. *A. heliaca*, recens; 6. *A. heliaca*, Lambrecht barlang felső pleisztocén

dist fragm. of phal. 2 dig. 2 posterior, phal. 2 dig. 3 post.

Villány 3 (= „Villány-Kalkberg”), age: Lower Pleistocene, leg. KORMOS: phalanx 3 digit 3.

Villány-Nagyharsány-hegy, age: the same, leg. KORMOS, phalanx 4 digit 3.

The above described material of the new species (*Surnia robusta*) is strictly confined to the Lower viz. Lowest Pleistocene of our area.

From an ecological point of view it may be of interest that the recent monotypical species lives today in the northern forest zone (taiga zone) of Eurasia and North America and in the mountain zone (mountain forest subzone) of especially central Asia. Migrations to the south are very limited.

It is a question whether the Lower Pleistocene form had the same ecological significance, in view of the fact that most of the remains originate — as we have seen — from the Submediterranean region of the Villány Mountains.

Genus: *Bubo*

Bubo aff. bubo Linné
(Fig. 5/4—5—6—7—8).

Material: Csarnóta, Loc. 2. age: Uppermost Pliocene, leg. KORMOS: anterior fragment of a mandibula.

Osztramos 7, age: Lowest Pleistocene, leg. JÁNOSY, 1971:

Püspökfürdő 2 (= Betfia 2), age: Middle Pleistocene, leg.: KORMOS: prox. fragm. of coracoideum; prox. fr. of phal. 2 dig. 2 posterior, phalanx 1 digit 2 posterior.

Vértesszőlős 2., age: Later Middle Pleistocene, leg.: JÁNOSSY, 1966: dist. fragm. of tibiotarsus.

Most of the enumerated fragmentary bones are not sufficient for a further taxonomical relegation. The measurements of the fragmentary bones and chiefly phalanges prove in any case the presence of a large owl of the size of the eagle owl (see Table 3) in the upper Pliocene, the Lower and Middle Pleistocene also in Hungary.

Some differences in the proportions of the phalanges are observable, but it is a question whether these features would have a taxonomical significance. The same is the case with some size differences. Concerning the fact that, some distinct geographical subspecies of the recent eagle owl display absolute differences in size (e.g. the variation in size of *Bubo bubo bubo* and of *Bubo bubo omissus* is not contiguous) — not to mention sexual dimorphism, — no inferences should be drawn on size. To analyse only briefly the fragment of the coracoideum originating from Püspökfürdő II: the size agrees with that of the snowy owl (*Nyctea nyctea*), but the proportions and the morphological details (chiefly the high position of the foramen supracoracoideum) speak unambiguously for a small specimen of the eagle owl. Exact measurements cannot be taken on this fragment.

The same is the case with the broken mandible fragment (Csarnóta) on which the position of the foramina nutricia indicates an owl and the size of a *Bubo*.

Owing to the fragmentary condition of the bones, there is no possibility to compare them with remains described from the Lower-Middle Pleistocene of Europe as *Bubo bubo* (Forest Bed, England, NEWTON, 1887) *Bubo* sp. (Sénéze, France, STEHLIN, 1923), *Bubo bubo davidi* Chauviré (Saint Estève Janson, France, 1975) and *Bubo binagadensis* Burchak-Abramovich (Binagady, Caucasus, 1965).

Bubo? florianae Kretzoi, 1958

Phalanx 2 digiti 2 from the Lower Pliocene Locality („Csákvárium”) of Csákvár, com. Fejér Western Hungary (see KRETZOI, 1958).

According to KRETZOI's description and figures the phalangeal bone is not convenient for further inferences than that, it originates from a very large owl. The dimensions of the bone do not overstep essentially those of the recent eagle owl. The length of the corresponding phalanx of the largest specimen of the recent collection (Budapest) is 30.3 mm, but I measured in the Collection of Milne Edwards the bones of cca 14% larger than the mentioned Budapest specimen the phalanges of which must have been about 33 mm and the piece of Csákvár is 34.7 mm. Of course we must suppose due to the high geological age being a taxonomical quite different form from the recent one.

Genus: *Asio*

Asio aff. *flammeus* Pontoppidan

Material: Betfia (formerly Püspökfürdő), Loc. 2, age: Middle Pleistocene (Betfia Phase). leg. JURCSÁK, 1958: distal two thirds of the tarsometatarsus.

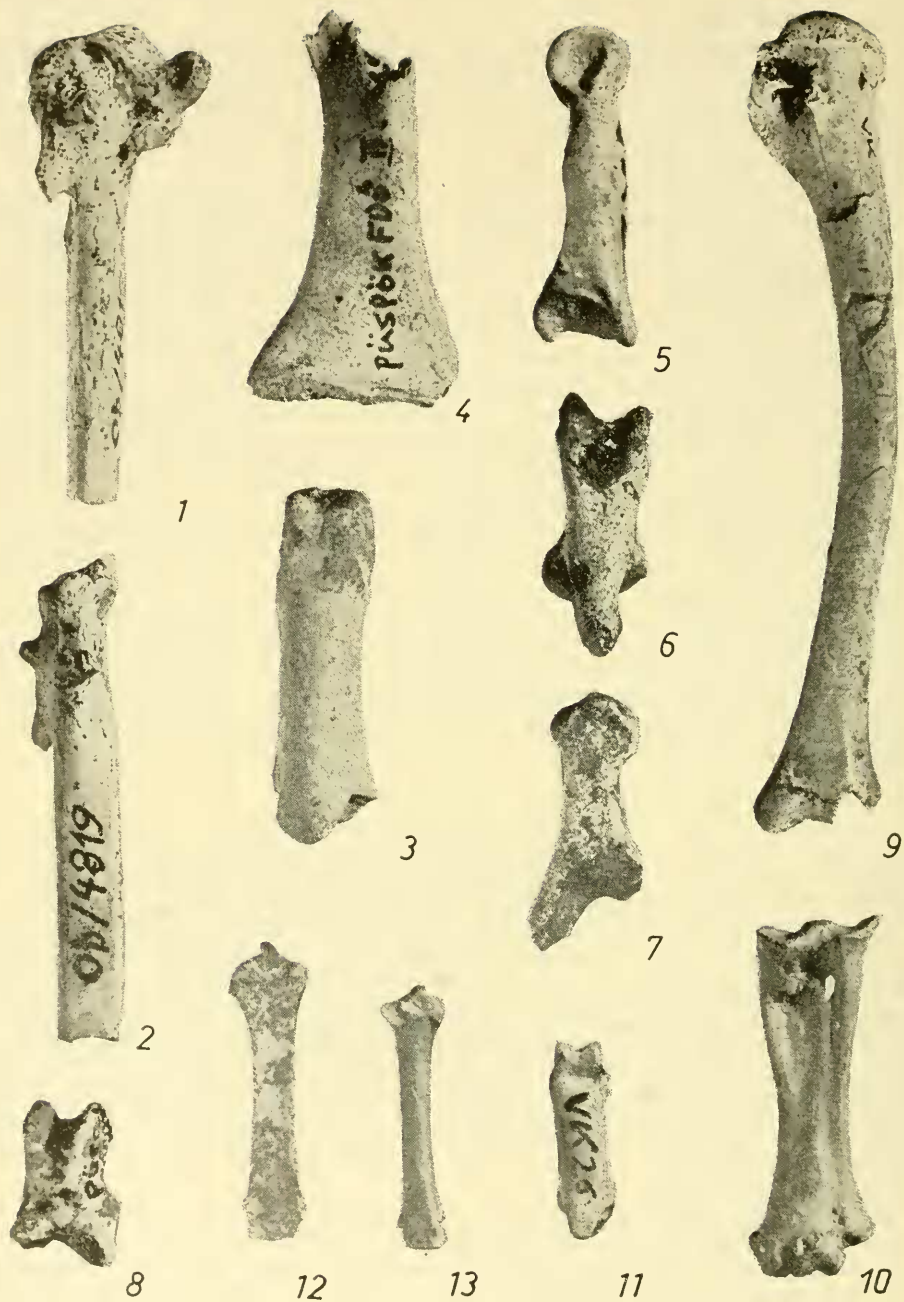


Table 3.

Measurements of different bones of fossil and recent forms of *Bubo bubo* (in mm)

Measurements	Length	Prox. width	Dist. width	Width of diaphysis (middle)
<i>Tibiotarsus:</i>				
Fossil, Vértesszőlős II.	—	—	18.0	—
Fossil, Saint Estève Janson	—	—	21.6	—
<i>n</i> = 4, mean acc. Chauviré, 1975				
Recent, <i>n</i> = 4	—	—	17.4–20.0	—
<i>Phalanx 1. digiti. 2. post.:</i>				
Fossil, Betfia (Püspökfürdő) 2.	15.7	10.0	8.0	—
Recent, <i>n</i> = 4	15.0–16.7	9.5–11.0	6.6–8.2	—
<i>Phal. 2. dig. 2. post.:</i>				
Fossil, Osztramos 7	—	—	6.7	—
Recent, <i>n</i> = 4	—	—	6.0–7.0	—
<i>Phal. 2. dig. 3. post.:</i>				
Fossil, Osztramos 7	16.0	8.4	7.6	—
Recent, <i>n</i> = 4	14.3–15.8	7.4–9.3	6.9–8.0	—
<i>Phal. 3. 2. dig. post.:</i>				
Fossil, Villány 3	25.0	7.0	5.5	6.0
Recent, <i>n</i> = 4	26.0–29.4	6.8–8.2	5.4–6.6	5.0–6.4

Fig. 5. 1. *Milvus brachypterus* n. sp., Loc. „Nagyharsány-hegy”, prox. fragm. of left carpometacarpus, medial view; 2. *Idem*, dorsal view; 3. *Aquila* cf. *chrysaetos* Linné, Villány Loc. 3., phalanx 2 digiti 2 dorsal view; 4. *Bubo* aff. *bubo* Linné, Püspökfürdő (= Betfia, Loc. 2) ventral twothirds of the left coracoideum, oral view; 5. *Idem*, Villány, Loc. 3. phalanx 3 digiti 3, lateral view; 6. *Idem*, Osztramos Loc. 7., phalanx 2 digiti 3, dorsal view; 7. The same phalanx, lateral view; 8. *Idem*, Püspökfürdő (= Betfia, Loc. 2.), phalanx 1 digiti 2, dorsal view; 9. *Surnia robusta* n. sp., Villány Loc. 3., right humerus, medial view; 10. *Idem*. *Ibidem*. left tarsometatarsus, dorsal view; 11. *Idem*. *Ibidem*. Phalanx 2 digiti 2, dorsal view; 12. *Apus baranensis* n. sp., Beremend Loc. 5., left ulna, dorsal view; 13. *Chaetura baconica* n. sp., Sümeg, right ulna, dorsal view. All figures enlarged (the figures 1., 2., 3., 8., 10. and 11. cca. one and a half times, the figures 4. and 9. cca. 1.2 times, fig. 5. and 6. cca. 1,7 times fig. 12. 3 times, fig. 13. 2 times enlarged). For exact measurements see the text

5. ábra. 1. *Milvus brachypterus* n. sp., „Nagyharsány-hegy”, bal carpometacarpus proximális töredéke, mediális nézetben; 2. u. az dorzális nézetben; 3. *Aquila* cf. *chrysaetos* Linné Villány 3., phalanx 2 digiti 2; felülnézetben; 4. *Bubo* aff. *bubo* Linné, Püspökfürdő (= Betfia, oc. 2) bal coracoideum ventrális része, orális nézetben; 5. u. az. Villány 3., phalanx 3 digiti 3, laterális nézetben; 6. u. az. Osztramos 7 phalanx 2. digiti 3, dorzális nézetben; 7. ugyana a phalanx, laterális nézetben; 8. u. az. Püspökfürdő (= Betfia, oc. 2), phalanx 1 digiti 2, dorzális nézetben; 9. *Surnia robusta* n. sp., Villány 3., jobb humerus, mediális nézetben; 10. u. az, bal tarsometatarsus, dorzális nézetben; 11. u. az, phalanx 2 digiti 2, dorzális nézetben; 12. *Apus baranensis* n. sp., Beremend 5, bal ulna, dorzális nézetben; 13. *Chaetura baconica* n. sp., Sümeg, jobb oldali ulna, dorzális nézetben. Vala mennyi ábra nagyítva (az 1., 2., 3., 8., 10. és 11. ábra kb. másfélszeres a 4. és 9. ábra kb. 1,2 szeres, az 5. és 6. kb. 1,7-szeres, a 12. ábra 3-szoros, a 13. ábra 2-szeres nagyításban). Pont sabb méreteket lásd a szövegben

Osztramos, Loc. 8., age: the same, leg. D. JÁNOSSY, 1971: dist. fragm. of the ulna.

Tarkó, Layer 2, age: Middle Pleistocene (Tarkó-Phase), leg. D. JÁNOSSY, 1961: prox. fragm. of the femur.

Vértesszőlős II. age: the same, leg. D. JÁNOSSY, 1963; phalanx I. digiti 3 posterior.

Uppony, Loc. 1, age: Later Middle Pleistocene (Uppony Phase); Leg. D. JÁNOSSY, 1963: Layer 1: prox. fragm. of the femur; phalanx 4, digit. 3 posterior; Layer 3: tarsometatarsus.

Among the enumerated remains the tarsometatarsi from Betfia and Uppony are the most convenient for a detailed analysis. We can compare the bone with that of the two morphologically nearest recent species, *Asio flammeus* and *Asio otus*. The difference in size between the tarsometatarsi of these two species is only statistical, the overlapping of variations makes a distinction in several cases impossible: I measured in *Asio flammeus* a length of 40—53 mm ($n=23$) and in *Asio otus* 36—43 mm ($n=32$) on materials of different European Museums (London, Paris, Berlin, Kraków, Budapest). However, there are some morphological differences between these two forms. In the first place concerning the contours of the bone in dorsal view, the proximal and distal widening of the bone is more expressed in the Long-eared Owl (*A. otus*) than in the Short-eared Owl (*A. flammeus*). In addition, the position of the tuberosity of musculus tibialis anterioris is lower in the former, and the bony bridge over the extensor groove is (on the average) broader in the latter.

These specific features cannot be observed unambiguously in the fossil material: we have rather a mosaic-like mixture of characters before us. The size of the fossil tarsometatarsi fall just in the range between the two species (the length of the Betfia-specimen may be estimated as 43—44 mm, that of the Uppony-specimen measures 42.4 mm), the whole shape of both bones (the proximal and distal widening in dorsal view) show the features of *Asio flammeus*, but, in contrast, the lowest point of the tuberosity of musculus tibialis anterioris is lower than in *A. otus*, and the bony bridge is narrower than in the latter species (the distance between the distal point of the middle trochlea and the lowest point of the tuberosity varies in *Asio flammeus* between 29.0 and 31.5 mm, the same measurement in the Betfia-specimen is 28.5 and in the Uppony-specimen 28.0 mm (with the length of 42.5 viz. 43—44 mm, this distance measures only at one minus-variant of the recent form 28.0 mm, but with a whole length of bone of 41.0 mm).

The preceding features simply that we have to do with a common ancestor of the short-eared and long-eared owls, although the morphological arguments are insufficient to establish this as a fact.

This hypothesis is supported by the fact that hitherto we do not know remains from the Older Pleistocene unambiguously determinable as *Asio otus*. On the other hand and from an ecological point of view, all remains of *Asio* originate from the onset of the Oldest Pleistocene, from boreal associations, characteristic for the recent *Asio flammeus*. Thus e.g. Rębielice Poland, Lower Pleistocene, together with Lemmings; Osztramos 8, Lower Pleistocene, with the same; Vértesszőlős II. and Uppony, Middle Pleistocene, together with ptarmigans and Lemmings let alone numerous localities from the Upper Pleistocene.

At the same time I have shown in another place (JÁNOSSY, 1974) that care should be taken as to climatological conclusions based on this species, because it is cosmopolitan today and breeds also in South Africa and South America

Genus: ? *Otus*
? *Otus scops* Linné

Material: Locality Püspökfürdő, fragment of the proximal epiphysis of an ulna (ČAPEK, 1917).

The ulna fragment originates without doubt from a small owl, and I compared it with the same bone of all smaller European members of the order (*Glaucidium passerinum*, *Aegolius funereus*, *Otus scops*, *Athene noctua*) as well as with that one of the Asian species *Otus brucei*. However, the characteristic parts are broken and not even the generic assignment appears to be sure, a relegation to *Aegolius* can not be excluded. The scops owl's bone is morphologically nearest to our specimen.

The fragment is not convenient for further conclusions.

Genus: *Aegolius*
Aegolius cf. funereus Linné

Material: Rockshelter Tarkó (Middle Pleistocene), Layer 3: anterior fragment of the Mandible, unguis phalanx (cf. phal. 4. digiti 3 posterior); Layer 10: prox. fragm. of the carpometacarpus; Layer 12: phal. 2 digiti 2 alae; dist. fragm. of the radius; dist. fr. of the femur, unguis phalanx.

The material agrees morphologically in all details with the corresponding bones of the recent Tengmalm's owl. Exact measures cannot be taken on the broken remains.

Besides some Upper Pleistocene materials (see list in this paper), I found *Aegolius* bones in the Middle Pleistocene of Stránká Skálá and Konieprusy (Czechoslovakia). MOURER-CHAUVIRÉ (1975) discussed some remains from the somewhat younger French Localities: La Fage, Orgnac 3 and Lazaret.

Genus: *Athene*
Athene veta Jánossy 1974

Material: Locality Osztramos 7; age: Lowest Pleistocene („Lower Villafranchian”): phalanx 2 posterior (pedis).

A detailed comparison of the phalanx with the corresponding one of *Otus scops*, *Glaucidium*, *Aegolius* and *Athene noctua* proves a close morphological resemblance with that of the last species. However, the bone differs in size and in the proportions absolutely from a series of the recent Little Owl the length measures 8.8 mm (in recent material, $n = 10$: 9.3—10.6 mm), the width of the middle of the diaphysis 1.8 mm (in recent material, $n = 10$: 2.0—2.4 mm).

Since the reexamination of the coracoid, originally described from the practically contemporaneous locality Rebielice (Poland) as *Athene noctua veta* (JÁNOSSY, 1974) proved that it is distinctly smaller than that of my recent minus—variant, I propose here elevate this clearly extinct form to specific rank. I have to do this the more as the subspecies described as *Athene noctua lunellensis* (Mas Rambault, Terra Amata, Orgnac 3, Lazaret 8) from the Middle Pleistocene of France by MOURER-CHAUVIRÉ (1975) is characterised, in contrast to our form, by larger dimensions than the recent species.

To my knowledge, the enumerated localities are the heretofore known data of the Little Owl from the Older Pleistocene of Europe. In another place (JÁNOSSY, 1974), I mentioned that the *Athene noctua* described from Püspökfürdő 2. was founded on a mistake (ČAPEK, 1917).

The rarity of the remains of the Little Owl in the Pleistocene can be interpreted as a sensitivity of this form against colder conditions, beginning with the Lowest Pleistocene.

Genus: *Glaucidium*

Glaucidium cf. passerinum Linné

Material: Loc. Püspökfürdő 2, Middle Pleistocene, coll. KORMOS (ČAPEK, 1917): very scanty fragments of two tarsometatarsi and of a coracoid.

The pieces agree in all details with the recent material. The fragmentary condition of the bones do not allow any measurements and thus no further inferences.

I found a very near form in the Oldest Pleistocene material of Rebielice and Kadzielnia (Poland) and in the material from the Middle Pleistocene of Hundsheim (Austria) (JÁNOSSY, 1974; 1975).

All remains found hitherto from the Older Pleistocene imply that the Pygmy Owls of that time were close related to the recent Eurasian species considered by zoologists as a purely taiga-alpine element.

Genus: *Strix*

Strix intermedia Jánossy, 1972

Material: Rockshelter Tarkó, Middle Pleistocene, coll. JÁNOSSY, 1960—65:

Layer 10: 2 cervical vertebrae, ulnare, tmt, 2 unguis phalanges.

Layer 11: Cervical and thoracic vertebrae, fragment of the phal. 1 digiti 2 alae, oral fragm. of scapula, 6 diaphysis fragments of tibiotarsi, 2 phal. 1 dig. 2 pedis, phal. 2 dig. 2 and phal. 3 dig. 3 pedis, unguis phalanx.

Table 4.

Measurements of the phalanges of middle sized recent and fossil members of the genus *Strix* (in mm)

Measurements	Length	Width of diaphysis (middle)
<i>Phalanx 1 digiti 1 pedis:</i>		
<i>Strix intermedia</i> , Tarkó, layer 13.	13.0	2.4
<i>Strix aluco</i> , recent	13.4	2.0
<i>Strix uralensis</i> , recent	14.5	3.2
<i>Phal. 1. dig. 2 pedis:</i>		
<i>Strix intermedia</i> , Tarkó, layer 11	9.8	4.0
<i>Strix aluco</i> , recent	10.3	3.7
<i>Strix uralensis</i> , recent	11.0	4.4
<i>Phal. 2 dig. 2 pedis:</i>		
<i>Strix intermedia</i> , Tarkó, layer 11	17.8	3.5
<i>Strix aluco</i> , recent	17.8	3.4
<i>Strix uralensis</i> , recent	20.6	3.8
<i>Phal. 3 dig. 3 pedis:</i>		
<i>Strix intermedia</i> , Tarkó, layer 11	15.6	3.2
<i>Strix aluco</i> , recent	14.7	3.0
<i>Strix uralensis</i> , recent	18.0	3.5

Layer 12: 2 cervical vertebrae, phal. 1 dig. 1 and phal. 1 dig. 2 alae, prox. fragm. of ulna, 2 fragments of radii, prox. fragm. (half) of humerus, (entire) coracoideum (type-specimen) about 15 small fragments of radii, tarsometatarsi etc.

Layer 13: Thoracic vertebra, dist. fragm. of the radius, prox. fragm. of the femur, phal. 1 dig. 1 pedis, 2 diaphysisfragments of tibiotarsi.

In the course of the description of this species I discussed the mosaic-like transitional osteological features between *Strix aluco* and *Strix uralensis* as well as the measurements of the Tarkó coracoideum it being the sole measurable one among the larger bones (JÁNOSSY, 1972). In addition I submit here measurements of some phalanges in Table 4. To avoid unnecessary repetitions, I refer to this description.

Since the identification of this extinct form from Hungary (Tarkó) and from Czechoslovakia (Konieprusy, Stránká Skálá), it was proved as widespread during the Middle Pleistocene in Europe (Austria: Hundsheim; JÁNOSSY, 1974; France: Saint Estève Janson: MOUBER-CHAUVIRÉ, 1975).

Strix aff. brevis Ballmann, 1969

Material: Loc. Rudabánya, age: Lower Pliocene, Lower Pannonian: proximal, fragment of a scapula and phalanx 1 digiti 2 posterior (pedis).

A thorough comparison of both bones proved them to be representatives of the genus *Strix*.

The scapula approximates in size that of a larger specimen of the recent *Strix aluco*, but the phalangeal bone is of a smaller size than the minus-variants of this species in the Collection of the Natural History Museum, Budapest.

The measurements are as follows: length of the phal. 1 dig. 2 posterior of the fossil is 7.9 mm (in the recent minus-variant 9.1 mm) the width of the diaphysis 3.4 mm (in the mentioned small specimen: 3.9 mm).

In view of the fact that, the species *Strix brevis* was characterised by BALLMANN (1969) as a form closely allied to *Strix aluco* but having different proportions, we can identify the geologically considerably younger Rudabánya-remains with some probability, against the difference in age, as those from Wintershof West. Unfortunately, in the latter locality there are absent the anatomical units of the former one, thus we cannot compare them immediately.

Though we have in our present material two remains of different size categories we may suppose them to represent one species exhibiting great variations in size, because the presence of two closely related contemporaneous forms relegated to one genus (*Strix*) seems improbable.

Order: *Caprimulgiformes*

Family: *Caprimulgidae*

Genus: *Caprimulgus*

Caprimulgus capeki n. sp.

Derivatio nominis: Dedicated to WACLAW ČAPEK (Brno, Czechoslovakia), who first discussed this form.

Diagnosis: Middle-sized species, with the coracoideum more robust than in *Caprimulgus europaeus*.

Type-locality: Karst fissure of the Locality Püspökfürdő 2 (= Betfia 2), near Nagyvárad (Oradea), Rumania.

Type-level: Middle Pleistocene, Biharian (Betfia-Phase).

Holotype: Nearly complete left coracoideum, leg. T. KORMOS; datum?; Inv. Nr. Geol. Inst. Vt 63.

Paratype: Phalanx 1. digiti 2 anterior, from the same locality.

Description: ČAPEK (1917) described the remains of Püspökfürdő 2. and identified them as *Caprimulgus europaeus*. He took note also of the robust form of the coracoideum and proposed to designate it — if an identity with *Caprimulgus europaeus meridionalis* can not be proved — as *Caprimulgus europaeus „fossilis”*.

A comparison of the coracoideum of seven recent specimens with the remain proves unambiguously the stouter form of our fossil piece. The length of the coracoideum (from the top of the acrocoracoid to the angulus inter-nus) of the new form measures 19 mm, the thickness of the middle of the diaphysis 2.5 mm. The same measurements vary in my recent comparative material between 18.6—20.0 mm, viz. 1.9—2.3 mm. The robustness of the fossil remain is observable also in the whole distal (cranial) part of the bone, although it is not possible to take exact measurements in this region of the coracoideum.

Mention must be made in this place of the fact that recent systematics distinguish about forty species of goatsuckers (Genus *Caprimulgus*) living in Europe, Asia, Africa, Australia, North and South America. However there is no reason to compare our fossil remains with the same anatomical unit of other species than of *Caprimulgus europaeus*. The zoogeographically nearly related species *Caprimulgus ruficollis* and *indicus* are larger, and *C. aegyptius* has a smaller body and a longer wing than the European species. Other species of the same size-category, as *C. rufigena* (South Africa), *C. batesi* (tropical Africa), *C. macrurus* (Indonesia, Northern Australia), or *C. rufus* (tropical South America), are zoogeographically not comparable with our remains. Other forms have quite different dimensions.

Among the heretofore known fossil goatsuckers from the Older Pleistocene of Europe, the remain designated as „aff. *Caprimulgus europaeus*” from Stránská Skála (JÁNOSSY, 1972) belongs unambiguously to the form described in this paper. The systematic position of the remains from France (La Fage, Orgnac, Lazaret 8), described by C. MOURER-CHAUVIRÉ (1975), must remain an open question.

Order: *Apodiformes*

Family: *Cypselidae*

Genus: *Chaetura*

Chaetura baconica n. sp.

(Fig. 5./13)

Derivatio nominis: „baconica” = Latinized and adjectival form of the Mountains Bakony (Western Hungary) in which the locality Sümeg lies.

Diagnosis: Middle-sized form of swifts; in the ulna and unguis phalanges morphologically nearer to *Chaetura* than to *Apus*.

Type-locality: 2 km South from Sümeg, Western Hungary, leg.: M. KRETZOR, 1971.

Type level: Lower Pliocene, „Sümegian”.

Holotype: Complete right ulna; Inv. Nr. Geol. Inst. Vt. 64.

Further material: proximal fragment of a posterior phalanx, three ungual phalanges.

Description and comparisons: The order of Swifts (*Apodiformes*) comprises an extremely large number of species (according to different authors, about 100 to 400 recent forms), widespread in the whole world.

According to a recent revision (BRODKORB, 1971), the following fossil species of this group have hitherto been described: *Cypselavus gallicus* Gaillard, *Cypselavus intermedius* Gaillard (Upper Eocen — Lower Miocene, France), *Apus ignotus* (Milne-Edwards), *Apus gaillardi* (Ennouchi) (Lower — Middle Miocene, France) and *Collocalia incerta* Milne-Edwards (Lower Miocene, France). (According to COLLIN'S (1976a) revision are *ignotus*, *incerta* and *intermedius* the same species!) The taxonomical status and the relationships of the family *Aegialornithidae*, chiefly with the swifts are so much disputed in literature that, we have to wait for the moment of the discussion of this problem (see HARRISON, 1975; COLLINS, 1976b etc.).

A detailed analysis and comparison of the ulna from Sümeg with the same bone of the recent Eurasian members of swifts available for study (*Apus apus*, *Apus melba*, *Apus affinis*, *Hemiprocyne comata*, *Collocalia brevirostris*, *Chaetura leucopygialis** and *Chaetura pelagica*, this latter one an American species approaching the Eastern Asiatic form) resulted in the followings:

The whole shape of the bone as well as the rate of torsion suggest *Chaetura*, and they differ from those of all other members of the genera compared. All features of the proximal epiphysis agree in detail with this genus: the form and shape of the olecranon, the ratio of surfaces of the facies glenoidalis interna and externa, the shape of the facies ligamenti externi as well as a pneumatic foramen in cranial and caudal views. The distal elongation of the trochlea carpalis differs from that of *Apus* and agrees with that of *Chaetura*. The length is 18.3 mm long, the diaphysis 2.1 mm wide. The value concerning the systematical relegation of the described features of the ulna is confirmed by the morphology of the ungual phalanges: there is a longitudinal groove on both sides (as in *Chaetura*) but lacking entirely in *Apus*, and the „plantar-proximal” tuberosity of this phalanx is quite similar in *Chaetura*. The proportions of these phalanges („robustness”) fall between *Apus* and *Chaetura*.

The morphological conformity with *Chaetura* is so significant that I assign the remains to this genus. In view of the fact that, there are no known fossil members of the „needle-tailed” swifts (*Chaetura*) we have to compare our fossils, as regards size, with that of the (about) 30 recent forms of the genus.

If we estimate, on the basis of the length of the fossil ulna, a wing length of 130—150 mm, no such size category appears in the Eurasian forms: in the SE Asiatic *Chaetura caudacuta* Latham we find 191—212 mm, in the Indian *Ch. indica* (Hume) 200 mm, in the Indian-Indonesian *Ch. gigantea* (Temm.) 200 mm (average), and in the Indonesian *Ch. leucopygialis* (Blyth) 120 mm (average). Only some zoogeographically highly removed form approach this size variation, although with a different variation span. Such forms are the South American *Chaetura rutila* (wing: 129—135), or the Subsaharan-African *Ch. ussheri* Sclater (wing: 141—152), or *Ch. cassini* Sclater (wing: 143—164).

* I received skeletons of the latter three species for comparison by courtesy of GRAHAM S. COWLES British Museum (Natural History); I express my gratitude also in this place

An immediate comparison of our Sümeg-remain (ulna) with the same bone of „*Apus*” *ignotus* Milne Edwards in the same size-category proves at the first glance on the basis of the drawings, the quite different proportions and morphology of the bones.

Genus: *Apus*

Apus baranensis n. sp.

(Fig. 5./12)

Derivatio nominis: From the comitat Baranya, Southern Hungary, in which the locality lies.

Diagnosis: The hitherto known smallest member of the genus.

Type-locality: Beremend 5, Southern Hungary, leg.: J. NOSKY 1952 (KRETZOI, 1956, p. 164).

Type-level: Lowest Pleistocene, Lower Villanyian, „Lower Villafranchian”.

Holotype: Complete left ulna; Inv Nr. Geol. Inst. Vt. 65.

Further material: Proximally incomplete right humerus.

Description and comparisons: In the description of the preceding species (*Chaetura baconica*), I gave an account of the systematical units of swifts as well as of the osteological differences between the members of the genera *Chaetura* and *Apus*. Accordingly, the bones from Beremend belong unambiguously to the genus *Apus*. The measurements of the bones are as follows: length of the ulna 13.0 mm, median width of the bone 1.8 mm, length of the humerus 9.5 mm, distal width of the same 3.8 mm. If we calculate, similarly as in *Chaetura*, on the basis of these bones the approximate wing length of the fossil form, we can estimate for this measurement a variation-span between 115—125 mm.

According to literature data the wing length lies between 130—230 mm in the about 30 species of the genus *Apus*, widespread in whole of Eurasia and chiefly in Africa. This measurement ranges only in the wing length of the species *Apus affinis* (Gray) between 122—147 mm, widespread in suitable places in Africa, Southern Asia and Indonesia. Thus even the largest part of the variationspan of this smallest recent species is also considerably larger than the estimated variation of our fossil form.

Apus submelba Jánossy, 1972

Material: Rockshelter Tarkó, Middle Pleistocene, „Tarkó-Phase”; leg.: JÁNOSY, 1960—1965: Layer 2: Two fragments of the carpometacarpi (in one only the diaphysis), fragm. of Phalanx 2 digit 2 alac (anterior) two unequal phalanges; layer 3: fragm. of phal. 2 dig. 2 alae, prox. fragm. of the ulna; layer 4: entire ulna (type — specimen: Inv. number: V. 64. 435). Without layer-indication: tibiotarsus dist. fragm. and fragm. of tarsometatarsus.

Rockshelter Uppony I., Middle Pleistocene, „Uppony Phase”; leg. JÁNOSY, 1963: layer 7: „proximal” phalanx pedis.

I described this form in detail when discussing the similar remains of Stránská Skála and describing the new species (JÁNOSY, 1972). To avoid unnecessary repetitions, I refer in this place only to the massiveness of nearly all bones of this form in contrast to the corresponding anatomical units of the nearest recent species, *Apus melba*. To supplement these data, I submit

here the measurements of the tibiotarsus, not included in the known material.

Width of diaphysis of the tibiotarsus in the fossil material 2.3 mm, in the recent one 1.8 mm. Distal width of the same bone in the fossil material 4.2 mm, in the recent one 3.9 mm.

In view of the fact that we have no proximal phalanges from the type-locality Tarkó we cannot compare the Uppony-material immediately with the former one and therefore the systematical relegation of the latter one must remain uncertain.

At the time of the description of this form it was known only from Stránská Skála and Tarkó. Subsequently it was recorded also from France, from the geologically contemporaneous layers at Saint Estève Janson (C. MOURER CHAUVIRÉ, 1975); this datum proves the wide distribution of this form in the Middle Pleistocene of Europe.

Apus apus cf. palapus Jánossy, 1974.

Material: Loc. Kövesvárad, Middle Pleistocene, „Templomhegy-Phase”, leg.: JÁNOSSY, 1958: phalanx 2, digit. 2, anterior.

Loc. Tarkó, layer 1. Middle Pleistocene,? „Uppony Phase” leg. JÁNOSSY, 1960: tibiotarsus dist. fragm. ungual phalanx.

These remains are too fragmentary to allow further investigations, we may state that we have before us remains from the size category of the recent species *Apus apus*. I assign them to the subspecies described from hundsheim only by stratigraphical arguments: both are in a wider sense geologically contemporaneous.

Order: *Falconiformes*

Family: *Accipitridae*

Genus: *Gyps*

Gyps cf. melitensis Lydekker, 1890

Material: Vértesszőlös Loc. 2.: leg.: JÁNOSSY, 1967: phalanx 2 digit. 2 posterior (pedis).

As I was able to show in other places (JÁNOSSY, 1960; 1961), the phalangeal bones of birds of prey are especially convenient for a taxonomic identification. The phalanx 2 digit, 2 from Vértesszőlös shows the characteristics of raptorial birds at the first glance. In addition the compressed form of the distal epiphysis is essentially a vulturoid feature. After detailed comparisons, the fossil phalanx reveals a close resemblance to the corresponding bone of *Aegypius monachus*. As is to be seen from the table of measurements, the Vértesszőlös specimen differs from the recent bone in proportions more than in size (see table 5.).

We might have considered this remain some years ago, without further ado, as the corresponding bone of the recent Black Vulture. However, after the revision of the rich Middle Pleistocene vulture material of hundsheim identifiable unambiguously as *Gyps melitensis*, — the phalangeal bones of which are rather *Aegypius* — like — the situation became different. Despite the fact that, I did not find in the Hundsheim-material the same phalanx as in Vértesszőlös, the relegation of it to *Gyps melitensis* seems analogically very likely.

Table 5

Measurements of the Phalanx 2 digiti 2 pedis of different European vultures (in mm)

	Length	Width of the diaphysis (middle)
Vértesszőlős II, fossil	26.5	7.3
Aegyptius monachus, recent 1.	28.0	7.4
2.	29.6	7.9
Gypaëtus barbatus, recent 1.	30.3	6.5
2.	33.0	6.7
3.	34.3	7.5
Gyps fulvus, recent 1.	28.2	6.5
2.	28.6	6.2

Although the phalanx from Vértesszőlős represents the only known remain of the fossil vulture (*Gyps melitensis*) of our territory in the earlier Middle Pleistocene, some geologically considerably younger remains speak for a survival of this form apparently until the threshold of the Upper Pleistocene. The first indication was very uncertain: a proximal fragment of a phalanx 2 digiti 2. from the Lambrecht Cave, Oldest „würm” (JÁNOSSY, 1964). I found in the type-material of the Maltese-collection of the British Museum (Natural History) a similar proximal fragment of the same phalanx of *Gyps melitensis* which is of the same size, but more robust than the piece of the Lambrecht Cave (height \times thickness of the former 11.0 \times 11.5 mm, that of the latter 11.0 \times 10 mm). However, the inference of the survival of *Gyps melitensis* in the region under discussion was strengthened by a distal fragment of a tarsometatarsus and by an ungual phalanx which I found in the (not published) material of the Repolust Cave — nearly contemporaneous with that of the Lambrecht Cave — stored in the Collection of the Museum Joanneum, Graz, Austria. The dimensions of this tarsometatarsus speak also for the presence of the extinct form.

C. MOURER—CHAUVIRÉ (1975) recorded the same form also from the Upper Pleistocene of France (Grimaldi, Soulabé).

Genus: *Milvus*

Milvus brachypterus n. sp.

(Fig. 5/1—2).

Derivatio nominis: from the Greek brachys = short, small, and pteron = wing, due to the shorter wing as indicated by the proportions of the type.

Diagnosis: Middle-sized species with a relatively broad and short carpometacarpus.

Type-locality: „Villány-Nagyharsány-hegy”*, Mts. Villány, Southern Hungary.

Holotype: Proximal half of the left carpometacarpus.

Description and comparisons: LAMBRECHT (1916, 1933) recorded this bone without a detailed description as „*Archibuteo lagopus*”, but pointed out the

* See the problematical designation of the diverse localities of Nagyharsány-hegy in the description of *Surnia robusta*

necessity of a thorough analysis of this and of other remains from the Older Pleistocene.

I compared the Nagyharsány-hegy fragment in detail with the corresponding bone of all European birds of prey, and found close relations only with *Milvus*, *Hieraetus (pennatus)* and with *Buteo (Archibuteo)*. The following arguments speak for an assignment to *Milvus* against the two other genera: the shape of the trochlea of the proximal epiphysis is in the proximal view rather more elongated than in *Buteo*, but lesser curved; the processus metacarpalis I. appears to be thicker in the anterior view, as in *Milvus*, but contrary in *Buteo* and *Hieraetus*; the region of the facies ligamentalis interna is stouter, like in *Milvus*, and the shape of the facies articularis interna agrees also with that of the latter genus.

Whereas we have a bone with the typical features of a *Milvus* before us, the position of the tuberositas muscularis is quite different from that in the two recent species of the genus: in *Milvus migrans* and *Milvus milvus*. This element lies proximally considerably nearer in the fossil form than in the recent ones. Accordingly the carpometacarpus of the Lower Pleistocene form must have been shorter than in the recent material. This absolute difference supports the taxonomical distinction of this form from the recent ones. In another respect, the Nagyharsány-hegy fossil falls in the same size category as the two recent species: the proximal width of the carpometacarpus measures 16.2 mm.

Hitherto only one fossil species of the genus has been described, from the Upper Oligocene of France (Langy), which is, independently from the high geological age, so much smaller than our fossil that a comparison is meaningless.

Genus: *Aquila*

Aquila cf. chrysaetos Linné

(Fig. 4. and 5/3)

Material: Villány 3 („Villány-Kalkberg-North” in older literature). Southern Hungary, „Lowest Pleistocene, Lower Villafranchian”, Lower Villányian. Leg. KORMOS: Phalanx 2 digit, 2 posterior (pedis).

The large phalanx (length 32 mm, width of the diaphysis 7.7 mm) agrees in all morphological details with the same anatomical unit of the diurnal birds of prey and among them with that of the large eagles. A comparison of the measurements of our fossil with 18 phal. 2 dig. 2 with recent and fossil specimens of *Aquila chrysaetos* (including 4 specimens of *A. chrysaetos bonifaci* Mourer Chauviré from Saint Estève Janson) failed to show differences in size or proportions. The fossil specimen falls in the middle of the variation of the recent species.

I also compared the Villány fossil with the corresponding bone of the large Eurasian eagle species, with *Aquila heliaca* Savigny and *Aquila rapax* (Temminck), but I found them to be absolutely smaller (see diagram, Fig. 4.). The same phalangeal bone of other larger, but zoogeographically more distinct eagles available in the collection of the British Museum (Natural History) like the African *Polemaetus bellicosus* (Daudin) and *Spizaetus coronatus* (Linné), the Southern Asiatic (Philippine Islands) *Pithecophaga jeffreyi* (Grant) or the Southern American *Harpia harpyia* (Linné) and *Geranoaetus melanoleucus* (Vielliot), are morphologically unambiguously different. Some resem-

blances appear concerning the Australian *Aquila (Uroaetus) audax* (Latham) as well as with the African *Aquila verreauxi* Lesson, but the metrical-morphological similarity with *Aquila chrysaetos* is unequivocal.

Thus we can establish the presence of the specific array of the golden eagle at first in the Lower Pleistocene of Europe. In view of the fact that a form, allometrically different from the recent species, lived in the Middle Pleistocene of Europe (*Aquila chrysaetos bonifaci* Mourer-Chauviré), we have to suppose the presence of an extinct species in the considerable older Lower Pleistocene. However since not even the phalanx 2 digiti 2 pedis of the Middle Pleistocene and also of the Lower Pleistocene form was submitted to the transformation of the evolution, we cannot draw further conclusions from them.

Genus: *Circus*

Circus sp. (array of *C. macrourus*)

Material: Osztramos Loc. 2. Uppermost Lower Pleistocene, Betfia phase; leg.: JÁNOSSY, Phalanx 1 digit. 2 anterior (alae).

The phalanx, showing the morphological features of a small bird of prey especially that of the genus *Circus*, represents a typical example of the mixture of characters of the different recent species. The phalangeal bone 23 mm long and 6 mm broad, agrees morphologically more with that *Circus macrourus* and *aeruginosus* (the latter one considerably larger than the former one), but metrically with that of *Circus cyaneus*; *C. pygargus* lacks in my recent comparative collection. Thus no further conclusions can be drawn on this remain.

Family: *Falconidae*

Genus: *Falco*

Falco aff. *atavus*, M. Chauviré, 1975

Material: Rockshelter Hórvölgy; age: Late Middle Pleistocene „Riss”, Castellum-Phase; leg.: JÁNOSSY, 1964; Proximal fragment of phalanx 1. digiti 2 anterior (alae).

Despite the fact that there is only a fragment of a phalangeal bone available, we can compare it with some recent falcons in the strict sense (larger species of the genus *Falco*). I compared it with the same anatomical unit of 6 specimens of *Falco peregrinus*, 4 specimens of *F. cherrug*, 1 specimen of *F. jugger* and 1 specimen of *F. rusticolus*. According to literary data, the two *Falco* species of the same size category besides the listed ones (*F. melanogenys* and *F. eleonora*) are on the average smaller. The fossil specimen seems to lie in size between *F. cherrug*, *F. peregrinus* and *F. rusticolus*. However, the fragment reveals that it was more robust than the same element in all of the recent species drawn into comparison.

In view of the fact of the approximately geological contemporaneity we may therefore infer the presence of a falcon which was described by MOURER-CHAUVIRÉ (1975) from La Fage. It is an extinct species, transitional between *Falco cherrug* and *rusticolus*, allometrically different from both forms and also more robust in their bones than each one.

Material: Püspökfürdő 2. (Betfia 2.); age: Middle Pleistocene, Uppermost Villafranchian Betfia Phase; leg.: KORMOS T.: 1 spec. juv. and 1 spec. ad. coracoideum, one prox. and three dist. fragments of the humerus two prox. fragm. of carpometacarpi, tarsometatarsus.

Villány-Nagyharsányhegy; age: uncertain? Lower Pleistocene; leg. KORMOS T.: incomplete distal fragment of a tarsometatarsus.

Méhész (Myhiska, Včelare); Middle Pleistocene, Templomhegy Phase; fragm. of a coracoideum.

When describing the new subspecies (JÁNOSY, 1972), I indicated some data which spoke for some metrical, viz. allometrical differences in different bones of the fossil and recent forms.

The proximal two-thirds of the humerus from Püspökfürdő 2. especially emphasize this difference. The proximal epiphysis is too fragmentary for taking measurements, however the width of the diaphysis of the bone is 5.4 mm. In the humeri of 19 recent specimens of the kestrel the length varies between 50—58 mm and the diaphysis of the same bone between 4.0—4.8 mm. This fact may in itself prove an absolute allometrical difference in the humerus of the two forms.

The identification of this form in the material of Stránská Skála, Hundsheim (JÁNOSY, 1972, 1974), as well as in six different localities in France (CHAUVIRÉ, 1975) proves its wide distribution during the Middle Pleistocene in Europe.

Fossil and subfossil occurrences of neospecies

The following localities of neospecies, assigned to orders discussed in this paper lie in the Carpathian Basin (remains not included in the lists by LAMBRECHT, 1933, and BRODKORB, 1964.; citation only at the first mention of a locality, materials without quotations on the evidence of newly identified pieces in the collection of the Natural History Museum, Budapest):

Order: *Strigiformes*

Surnia ulula (Linné)

„Prewürmian”: Lambrecht Cave (Layer IV.) (JÁNOSY, 1964).

Lower Würmian: Gencsapáti.

Nyctea nyctea (Linné)

„Prewürmian”: Lambrecht Cave (Layer IV.).

Upper Würmian: Bivak Cave (Yellowishgray Layer): Jankovich Cave (Collection JÁNOSY, 1955); Buják.

Asio flammeus (Pontoppidan)

Lower Würmian: Curata Cave (Nándor = Nandru, near Vajdahunyad = Hundoara, JÁNOSY, 1965); Tokod-Nagyberek (JÁNOSY, 1971).

? Upper Würmian: Jankovieh Cave (Coll. 1955); Szelim Cave (Layer B); Hóman Cave (Bajót, Óregkő); Ripa (= Rippa, near Nagyszalonta = Salonta, Hamar M.—Csák K., 1969 det. JÁNOSSY).

Aegolius funereus (Linné)

Lower Würmian: Subalyuk Cave (Layer 11, coll. JÁNOSSY, 1964).
Upper Würmian: Szelim Cave (Layer B).

Bubo bubo (Linné)

„Prewürmian”? Lambrecht Cave (Lay. IV.).
Lower Würmian: Tokod-Nagyberek.
Holocene: Neolithic: Polgár-Csőszhalom; 17—18 century: Visegrád Alsóvár (BÖKÖNYI—JÁNOSSY, 1965).

Athene noctua (Linné)

Holocene: Rockshelter Pilisszántó II.

Strix aluco (Linné)

Holocene: Rockshelter Petényi (Layer H₁—H₂): Rocksh. Mélyvölgy (Mecek Mountains); Cave of Csév (JÁNOSSY, 1959); Legény Cave.
Neolithic: Vlassac, Iron Gate, Danube (Yugoslavia)
14. and 15—16. century: Visegrád Palota (BÖKÖNYI—JÁNOSSY, 1965).

Strix nebulosa (Forster)

Lower Würmian: Curata Cave.

Strix uralensis Pallas

Holocene, Neolithic: Aggtelek Cave.

Order: *Apodiformes*:

Apus apus (Linné)

Besides the above mentioned Middle Pleistocene remains of the subspecies, also palapus from Kövesvárad and Tarkó, Layer 1:

Upper Würmian and Holocene: Petényi Cave (Layer P₁ and „mixed Holocene”).

Apus melba (Linné)

Lower Würmian: Subalyuk Cave (Layer 3, newly collected in 1964, former published material, JÁNOSSY, 1961, originating from older collections labeled as „Lower Layer-Group”).

Order: *Falconiformes*

Aegypius monachus (Linné)

Lower Würmian: Subalyuk Cave (uncertain identification JÁNOSSY, 1961; rectified recently); Beremend, loessic sediment (Coll. Geol. Inst. det. JÁNOSSY); Curata Cave.

Holocene: 15—17. century: Visegrád Alsóvár.

Aquila chrysaetos Linné

(Besides the Lower Pleistocene find Villány 3):

Upper Würmian: Rockshelter Pilisszántó I. (JÁNOSSY, 1960, but not Subalyuk, as erroneously listed by BRODKORB, 1964 page 283).

Holocene: Bronze Age: Tápiószele Tűzköves.

Aquila heliaca (Savigny)

„Prewürmian”: Lambrecht Cave, Layer V.

Holocene: Neolithic: Vlassac, Iron. Gate, Danube (Yugoslavia)

Aquila cf. clanga Pallas

Lower Würmian: Curata Cave

Haliaetus albicilla (Linné)

Lower Würmian: Except for the hitherto known loc. Krapina (LAM-BRECHT, 1933, p. 746), the Curata Cave.

Holocene: Neolithic: Berettyószentmárton, Vlassac, Iron. Gate etc. Roman: Tác-Fövénypuszta; „Árpád-Age”, 10—13. century: Tiszalök-Rázom; Middle Age, 15—17. century: Gyula-Vár.

Milvus cf. migrans Bodd

Holocene: Neolithic: Vlassac, Iron. Gate, etc. 14. century: Visegrád-Kál-vária.

Buteo buteo (Linné)

„Prewürmian”-Lower Würmian: (cf.) Lambrecht Cave (Layer IV): Diósgyőr Cave (leg. KORDOS, det. JÁNOSSY, 1975);

? Upper Würmian: Buják

Holocene: Bronze-La Tène Age: Budapest-Gellérthegy, 15—17. century: Gyula-Vár

Buteo cf. lagopus

Lower Würmian: Curata Cave.

Upper Würmian: Bivak Cave (Yellowish Layer).

Circus aeruginosus Linné

Holocene: Roman: TÁC-FÖVÉNYPUSZTA.

Circus cf. macrourus Gmelin

Upper Würmian: Rockshelter Pilisszántó (new identification JÁNOSSY 1975).

Accipiter gentilis Linné

Lower Würmian: Lambrecht Cave (Layer IV).
Holocene: Roman: TÁC-FÖVÉNYPUSZTA.

Accipiter nisus Linné

Middle Pleistocene: (extinct form?) Rockshelter Tarkó (Layer?)

Pernis apivorus Linné

Lower Würmian: Lambrecht Cave (Layer IV); Curata Cave.

Falco peregrinus Tunstall

Upper Würmian: Bivak Cave (Yellowest Layer); Jankovich Cave. Hóman Cave (Bajót, Öregkő, new identifications, JÁNOSSY, 1975).

Falco rusticolus Linné

Upper Würmian: Szelim Cave (Layer B).

Falco columbarius Linné

Lower Würmian: Lambrecht Cave (Layer V.).
Upper Würmian: Szelim Cave (Layer B); Petényi Cave (Layer P₁).

Falco subbuteo Linné

Upper Würmian: Szelim Cave (Layer B); Bivak Cave (Yellow and yellowish grey Layers).

Falco vespertinus Linné

Middle Pleistocene: (cf.) Uppony (Layer 6).
Upper Würmian: Hóman Cave.

Falco tinnunculus Linné

Besides the preceding Middle Pleistocene remains of the subspecies *ata-vus*:

Middle Pleistocene: Rockshelter Hórvölgy

Lower Würmian: Subalyuk (Layer 3, leg.: JÁNOSSY, 1964); Curata Cave, Érd (KRETZOI, 1968).

Upper Würmian: Szelim Cave (Layer B); Petényi Cave (Layer P₁); Remete Cave (Layer 11); Ripa (= Rippa near Nagyszalonta = Salonta, Hamar-Csák, 1969; det.: JÁNOSSY).

Conclusions

Despite the fact that all remains, excepting those of *Galliformes* are not convenient for establishing evolutionary lines, some inferences can be drawn on the mosaic-like, sporadical finds in also other orders.

1. According to the hitherto known paleontological data, it may be established that an ancient form of a middle-sized member of the genus *Strix* was present from the beginning of the Neogene in Europe (Middle Miocene: Wintershof-West; Lower Pliocene: Rudabánya). The divergence of the two European forms, *Strix aluco* and *uralensis*, may supposedly begin with the Middle Pleistocene form *Strix intermedia*. Large forms of the array of *Strix nebulosa* appear from the beginning of the Pleistocene (Rebielice, Poland), through the Middle Pleistocene (Stránská Skála, Czechoslovakia) outside of the Carpathian Belt and reached at the level of our present knowledge, the Southern part of the Carpathian Basin (Curata Cave, Roumania) only in the Upper Pleistocene.

2. The traces of the presence of a large owl of the size of the present eagle owl (*Bubo spp.*) are known from beginning of the Neogene in the region; they lived practically continuously until recent times.

3. We have the first proof for the appearance of a representative of the hawk owls, of the genus *Surnia*, in the Lower Pleistocene, yet only south from Northern Carpathian Belt (*Surnia robusta n. sp.* from the Villány Mountains and Osztramos 7). The „modern” form of the hawk owls appears only north from the region under discussion (*Surnia capeki*); it was later widespread chiefly in the eastern parts of our continent (see the lists by LAMBRECHT and BRODKORB on the Upper Pleistocene remains).

4. The ancestor of the little Owl (genus *Athene*) was only present in the north in Lower Pleistocene times (Rebielice, Osztramos 7), surviving the Middle and Upper Pleistocene in the south (e.g. Southern France), it appeared newly in the Holocene in our territory (Pilisszántó II.).

5. Some recently northern forms appeared beginning with the Lowest Pleistocene (*Asio cf. flammeus*, geologically oldest remains from Rebielice) or with the Middle Pleistocene (*Aegolius*, *Glaucidium*, Middle Pleistocene of Tarkó, Betfia, Hundsheim etc.) only in slightly differing from their recent descendants.

6. The remains of the nightjars (*Caprimulgiformes*) and of the swifts (*Apodiformes*) are so scarce that they are not convenient for further conclusions. Only the presence of the recently partially American but chiefly Indo-malayan-Éthiopian genus *Chaetura* in the Lower Pliocene of Sümeg is remarkable from a zoogeographical point of view.

7. The case is nearly the same with the remains of (diurnal) birds of prey: they may be considered chiefly as sporadic finds. We can only follow the

evolutionary line of the small falcons (kestrel, *Falco tinnunculus atavus*), beginning with the Lower Pleistocene; the first proof of the presence of the array of species of the golden eagle (*Aquila chrysaetos*), represented by the found from the Lower Pleistocene (Villány 3.), may yet be registred as a new results.

The enrichment of the fauna of birds of prey at the end of the Last Interglacial is remarkable (Lambrecht Cave, Subalyuk, Curata etc.).

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Plio-pleisztocén madármaradványok a Kárpát-medencéből III. Strigiformes, Falconiformes, Caprimulgiformes, Apodiformes

Jánossy Dénes

A hasonló tárgyú előző két dolgozatban a megadott terület tyúkalkatú maradványai kerültek feldolgozásra (I—II. részek), amelyek a leletek mennyisége és időbeli folyamatosága révén egyedül voltak alkalmasak arra, hogy segítségükkel megszakítatlan törzsfelődési sorokat is összeállíthassunk.

A Kárpát-medence itt sorra kerülő madármaradványai már az előbbiekhöz képest szórványleleteknek tekinthetők, legfeljebb egy-egy lelőhelyen, izoláltan halmozódtak fel fossziliák nagyobb mennyiségben. Ennek ellenére ezek a maradványok is igen jelentősen egészítik ki Európa madárfaunájának kialakulására vonatkozó mindeddig nagyon hiányos tárgyi ismereteinket.

A bagolyalkatúak revíziója igazolta, hogy a macskabagolyok csoportja (*Strix* nemzettség) nemcsak a németországi középső miocénből, hanem a hazai legalsó pliocénből is kimutatható (*Strix cf. intermedia* Ballmann, Rudabánya). Az eddigi leletek alapján valószínű, hogy a két jelenlegi Eurázsiai középnagy faj, a macskabagoly és az urali bagoly egy középső pleisztocén átmeneti alakból származik (*Strix intermedia* Jánossy, típusanyaga a tarkói kőfülkéből, de Ausztriából: Hundsheim és Franciaországból: Saint Estève Janson is előkerült). A macskabagoly (*Strix aluco*) a középső pleisztocén második felében kialakult faj és a felső pleisztocén hideghullámok idején a mérsékelt övben hiányzott, amikor az urali bagoly (*Strix uralensis*) ezen a területen jelen volt (Csehszlovákia, Magyarország: Certova díra, Pálffy-barlang, Remete-kőfülke.) A macskabagolyok harmadik, legnagyobb méretű holarktikus alakjának, a szakállas bagolynak (*Strix nebulosa*) a maradványai az alsó és középső pleisztocénből már ismeretesek, de csak a Kárpátok gyűrűjén kívüli területről (Lengyelország: Rebielice, Csehszlovákia: Stránská Skála, Brno mellett). A Kárpát-medencén belül eddig ismert egyetlen lelet az Erdélyi-medence déli részének felső pleisztocénjéből ered (Curăți barlang, Vajdahunyad — Hunedoara mellől).

A mai uhu ősi alakjának jelenléte területünkön már az alsó pliocéntól kezdve igazolható (*Bubo? floriana* Kretzoi, Csákvári barlang). A legalsó (Osztramos 7), alsó (Vilány 3), középső (Betfia 2, Vértesszőlős 2) és felső pleisztocén (Tokod — Nagyberek stb.) leletei bizonyítják ezenként állandó előfordulását a Kárpát-medence és a legújabb földtörténeti időszakokban.

A kukik ősi alakja (*Athene veta* Jánossy) jelenlegi ismereteink szerint a legalsó pleisztocénben északon fordult elő (Lengyelország: Rebielice; Észak-Magyarország: Osztramos 7), a középső és felső pleisztocénben a mérsékelt égövi faunában is hiányzik (biztosan

fosszilis maradványai csak Dél-Franciaországból, Olaszországból ismertek, s ezután csak a holocénben jelenik meg újra területünkön (Pilisszántó I. és II. kőfülke).

A karvalybagolynek egy — a mainál esontjaiban 20—40%-kal nagyobb — kihalt faja eddig, a várakozásokkal ellentétben, területünk délibb részein fordult elő az alsó pleisztocénben (*Surnia robusta n. sp.*, Villányi hegység, legészakabbra Osztramos 7). A mai karvalybagolytól már kevésbé eltérő alak (*Surnia capeki* Jánossy) már északabbra, a Kárpátok gyűrűjén kívül fordult elő (Brno: Stánská Skála), míg a maival egyező faj a felső pleisztocénben Európában szinte csak a tágabb értelemben vett Kárpát-medencére korlátozódott — az eddig ismert leletek alapján — (beleértve a felső-ausztriai Kremset is, 9 lelőhelyről több mint 50 maradvány). Figyelemre méltó, hogy a Kárpát-medencén kívül Európa felső pleisztocénjéből mindössze három karvalybagoly-lelethely ismeretes (Sváje egyetlen, Lengyelország 2 lelőhely), egyébként ebből az időszakból még a Szovjetunióból sem ismerünk ilyen maradványokat.

A karvalybagolyon kívüli többi, jelenleg főleg tajgai elterjedésű bagolyfaj a *Icthyophaga* pleisztocéntól (*Asio cf. flammeus*, a geológiaiilag legrégebb leletek a dél-lengyelországi Rębiclice-ből erednek, a későbbiek is mindig „glaciális” elemekkel együtt), ill. a középső pleisztocéntól kezdve (*Aegolius* és *Glaucidium* Tarkó, Betfia, Hundsheim stb. leletei) területünk északibb részein fordulnak elő, és esontozatilag alig különböznek a maiaktól.

A kecskefajok és sarlósfecskék eddigi leletei olyan szórványosak, hogy további következtetésekre kevésbé alkalmasak. Beremend legalsó pleisztocénjéből egy rendkívül kis-termetű kihalt sarlósfecskefaj került elő (*Apus baranensis n. sp.*). A jelenleg mediterrán „havasi” sarlósfecske (*Apus melba*), valamint a hazánkban jelenleg is élő faj (*Apus apus*) ősi alakjai a középső pleisztocéntól előfordultak területünkön (*Apus submelba* Jánossy és *Apus apus palapus* Jánossy). Állatföldrajzi szempontból figyelemre méltó a sümegi alsó pleisztocénből egy kihalt „sertefarkú” sarlósfecske (*Chaetura baconica n. sp.*), melynek rokonsági köre jelenleg fele részben indomaláji — etiópiai —, csak fele részben amerikai fészkelő.

A nappali ragadozók fossziliái is legnagyobb részt szórványleletek. Ezek közül a Nagy-harsány-hegyi alsó pleisztocénből egy kihalt kányafaj (*Milvus brachypterus n. sp.*) került leírásra. A villányi, szintén alsó pleisztocén szirti sas (*Aquila chrysaetos*) lelet e nagyragadozó jelenlétének legrégebb dokumentációja Európában. Egyedül a véresék törzsefejlődési sora követhető az alsó (Nagyharsány-hegy) és középső (Betfia, Méhész) pleisztocénen keresztül napjainkig. További szórványleletek a vértesszőlősi középső pleisztocén *Keselyű-* (*Gyps cf. melitensis* Lydekker) és egy hasonló korú *rétihéjalelet* Osztramos 2 lelőhelyről (*Circus cf. macrourus* Gm.).

Egy nagy termetű sólyom pleisztocénkori jelenlétére utal a középső pleisztocén végéről származó hórvölgyi barlangi lelet (*Falco aff. atavus* Chauviré).

Az utolsó interglaciális lelőhelyek ragadozóknak való viszonylagos gazdagsága figyelemre méltó.

A dolgozatot kiegészíti a tárgyalt rendszertani egységekbe sorolható mai fajok pleisztocén-holocén leleteinek jegyzéke, az elmúlt évtized újabb meghatározásai alapján (lásd 29-33. oldalak).

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